McCutcheon Street Bridge
(Bridge No. K0861R)
Spanning Interstate 64
Saint Louis
St. Louis County
Missouri

HAER No. MO-115

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Midwest Regional Office
National Park Service
601 Riverfront Drive
Omaha, Nebraska 68102-4226

HISTORIC AMERICAN ENGINEERING RECORD

MCCUTCHEON STREET BRIDGE
(Bridge No. K0861R)

HAER No. MO-115

Location:	Spanning Interstate 64 Saint Louis St. Louis County Missouri
UTM:	Zone 15 Northing 4279207 Easting 730269
Quad:	Clayton, Missouri – Missouri 7.5' Quadrangle, 1993
Construction:	1944-46
Designer:	Sverdrup and Parcel
Present Owner:	Missouri Department of Transportation, Jefferson City, Missouri
Present Use:	Vehicular overpass to be removed and replaced by a new vehicular overpass; projected date of removal in 2007.
Significance:	The McCutcheon Street Bridge is a rare Missouri example of a concrete rigid- frame bridge. The bridge was built in response to increased traffic and westward expansion of the St. Louis metropolitan area. Although the bridge was designed in the early 1940s, its construction was delayed due to the United States' entry into the Second World War. Only seven concrete rigid-frame bridges were built by the Missouri State Highway Department and all were built in urban settings. The McCutcheon Street Bridge represents a well-preserved example of a unique structural design, and it is also a visible reminder of early efforts to improve traffic flow in suburban St. Louis.
Project Information:	The McCutcheon Street Bridge was recorded in 2007 by Thomas J. Gubbels, Missouri Department of Transportation, Historic Preservation Section, P.O. Box 270, Jefferson City, Missouri, 65102.

I. Physical Description of the McCutcheon Street Bridge

The McCutcheon Street Bridge, also known as Bridge K0861R, is a ribbed, two-span reinforced concrete rigid-frame structure. A rigid-frame bridge is defined as a bridge where the piers and deck girder are joined to form a single structure. Unlike ordinary girder bridges where the deck rests on either fixed or expansion bearings atop a separate substructure, a rigid-frame bridge acts as a single functional unit. In the case of Bridge K0861R, concrete was poured into wood forms on several occasions and allowed to set as a single unit. Thus, the bridge does not have a separate substructure and superstructure.

The outside of Bridge K0861R is buttressed by two reinforced concrete wingwalls. These wingwalls rest atop large square footings measuring 14' x 9' with a thickness of 2'-6". Each wingwall measures approximately 22'-8" in height when measured from the base of the footings to the roadway above and 39' in length when measured from the outside edge of the bridge approach to the outside edge of the concrete frames that form the core of the McCutcheon Street Bridge.

The deck of Bridge K0861R was poured atop five concrete frames supported by buried concrete pedestals and central piers that divide the bridge's two spans. The large buried pedestals underneath the central piers measure 8' x 8' at their base with a height of 13'-3', while the pedestals on the outside of each frame vary in size from 7' x 7' to 13' x 11'-8" at their bases. The five frames within Bridge K0861R vary dramatically in height, width, and thickness, but they were all designed so the entire structure would allow a minimal vertical clearance of 14' for traffic passing underneath the bridge. In addition, the center of the outside walls of each frame is 62'-3/8" from the central piers, allowing for several traffic lanes beneath the structure. The columns of each frame and the central piers are slightly skewed, turning eight degrees away from the centerline.

The deck of Bridge K0861R was laid in a sequence of six pours performed after the concrete frames, central piers, and supporting wingwalls had been poured and allowed to set. The bridge deck carrying McCutcheon Road is 124' long, and it features a slight 0.5 percent upward grade from north to south. The roadway across the bridge is 44' wide to accommodate several lanes of traffic, and the bridge deck is approximately 10-1/2" thick with a 2-1/2" parabolic crown. Generous sidewalks measuring 5'-2" in width were built along both sides of the bridge. These walkways are protected from traffic by a 20" high curb and standard 3' concrete guardrails.

Decorative rectangular emblems and linear designs were incised on the outsides of the central pier and the concrete frames to enhance the aesthetics of the structure. The emblems on the outside central pier were covered in 1992 when interstate highway signs

were installed on the outside of the bridge. Other than these minor changes Bridge K0861R remains essentially unaltered from when it opened to traffic in the mid-1940s.[1]

II. History of the McCutcheon Street Bridge

Throughout the 1930s the demographics of Missouri's largest city, St. Louis, were slowly changing. Large numbers of St. Louisians were moving away from congested urban neighborhoods to new subdivisions on the western fringe of the metropolitan area. New suburbs such as Chesterfield and Richmond Heights were beginning to draw people away from St. Louis' declining urban core. The population of the City of St. Louis declined during the 1930s, but the population of St. Louis County grew by approximately 12 percent. Due in part to this demographic shift, automobile traffic on St. Louis' east-west roads increased throughout the decade.[2] The Missouri State Highway Department conducted several traffic studies during the 1930s, and the results of these studies showed that highways linking St. Louis' central business district to communities on the edge of the metropolitan area needed to be built in order to maintain a vibrant regional economy.[3]

To alleviate growing traffic problems in the St. Louis area, the Missouri State Highway Department decided to build two new expressways. The first expressway was to be constructed along Oakland Avenue, a major thoroughfare immediately south of Forest Park that carried heavy traffic. Construction of this new route began in 1935 and was completed in 1938. A second expressway to serve growing suburbs on the western

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[1]The physical description of Bridge K0861R is based on Missouri State Highway Department, "Bridge on McCutcheon Road Over US 40TR," microfiche copy available from Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri; and Missouri Highway and Transportation Department, "Job No. J6U0897: Sign 90, Bridge K0861R," microfiche copy available from Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri. When bridges owned by the Missouri Department of Transportation undergo a major rehabilitation or change in their appearance, the letter "R" is added to the end of their formal designation to indicate that the structure has been rehabilitated. Because of this convention, Bridge K0861was relabeled Bridge K0861R when interstate signs were installed on the outside of the structure in 1992.

[2]Caroline Loughlin and Catherine Anderson, *Forest Park* (Columbia, Missouri: University of Missouri Press, 1986), 175-176; James Neal Primm, *Lion of the Valley: St. Louis, Missouri*, 2d ed. (St. Louis, Missouri: Missouri Historical Society Press, 1990), 472-473; and St. Louis City Plan Commission, "Physical Growth of the City of Saint Louis," 1969, downloaded 12 April 2006 from http://stlouis.missouri.org/heritage/History69/.

[3]For detailed discussions of urban traffic studies conducted during the 1930s, see Missouri State Highway Commission, *Ninth Biennial Report of the State Highway Commission of Missouri for the Period Ending December 1, 1934* (Jefferson City, Missouri: Missouri State Highway Commission, 1934, 427; and *Official Manual of the State of Missouri for Years Nineteen Thirty-Nine and Nineteen Forty* (Missouri Secretary of State: Jefferson City, Missouri, 1940), 685.

edge of St. Louis was also planned by the highway department. This road would begin west of St. Louis in Richmond Heights and connect to Wentzville, a small farming community in western St. Charles County. The new expressway was to feature a divided highway and controlled access, and it was dubbed the "Daniel Boone Expressway."[4] This expressway promised to relieve traffic in the St. Louis area, but the highway department had to be careful how it paid for the project so it would not run afoul of state laws that limited urban highway construction.

In the early twentieth century the Missouri General Assembly was apportioned in such a way as to favor rural interests over urban concerns, and thus the Centennial Road Law was biased toward rural road construction. For example, all road funds given to county governments had to be distributed equally among the different counties regardless of population or traffic levels. In addition, the Centennial Road Law allowed the Missouri State Highway Department to build roads connecting Missouri's cities and towns, but the department could not build roads within cities with a population greater than 2,500 or areas where houses on either side of the street were less than 200 feet apart.[5] To get around these restrictive state road laws the highway department officially designated the Daniel Boone Expressway "Traffic Relief Route 40," often shortened to Route 40TR. Missouri voters in 1928 approved the sale of $75 million of bonds to pay for road construction. The 1928 bond issue also allowed the highway department to construct traffic relief routes in urban centers to ease road congestion.[6] The department seized upon this new law to justify construction projects in St. Louis and Kansas City, and it provided a loophole allowing the construction of urban projects such as the Daniel Boone Expressway. The laws that prohibited the use of state money for urban highway projects were later repealed when the Missouri State Constitution was rewritten in 1945.[7]

When Missouri State Highway Department designers began to draw up plans for the Daniel Boone Expressway, they quickly realized that several overpass structures would be needed to carry local streets across the controlled access highway. One street

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[4]Tim O'Neil, "U.S. 40 Battles Recur," *St Louis Post-Dispatch*, 1 November 1992, 1D; and Virgil Tipton, "The Way West: Highway 40 Grew in Fits and Starts Over 60 Years," *St. Louis Post-Dispatch*, 19 September 1994, 1A.

[5]Missouri State Highway Commission, *Roads and their Builders* (Jefferson City, Missouri: Division of Public Information, n.d.), 115-116.

[6]Missouri State Highway Commission, *Seventh Biennial Report of the State Highway Commission of Missouri for the Period Ending December 1, 1930* (Jefferson City, Missouri: Hugh Stephens Press, 1930), 109-111.

[7]For the specific revisions made in 1945 to Missouri's road laws, see Missouri Constitution [1945], art. 4, sec. 29-34.

that needed an overpass was McCutcheon Street, a busy thoroughfare connecting several neighborhoods in Richmond Heights, a bustling St. Louis suburb. The department also planned to build overpasses along the new expressway at Lay Road, Clayton Road, and the Terminal Railroad line. Preliminary surveys and soundings were conducted at these sites in the summer and fall of 1939, but preliminary plans for the McCutcheon Street overpass were not completed by the highway department until the spring of 1941.[8]

Preliminary plans for the McCutcheon Street Bridge, also designated Bridge K0861, were circulated throughout the Missouri State Highway Department's Bridge Division in April 1931 for internal review. The plans called for the construction of a two-span concrete rigid-frame bridge carrying a 44'-wide McCutcheon Road across the expressway. The frames of Bridge K0861 were to feature a slight skew to allow traffic to pass freely underneath. Plans also called for a slight lowering of the grade of the Daniel Boone Expressway as it passed beneath the McCutcheon Street Bridge. This was needed to guarantee a minimum vertical clearance of 14' between the bottom of the bridge and the roadway below. Finally, preliminary plans noted that design details for the new bridge should be taken from the plans for another structure designed by the highway department, Bridge K0854.[9]

Bridge K0854 was a concrete rigid-frame bridge that carried traffic across the Daniel Boone Expressway. This bridge was located at the interchange between the expressway and Lay Road, later renamed McKnight Road, on the western edge of Richmond Heights. Designs for Bridge K0854 were drawn up about a year before the plans for Bridge K0861, and the layout of the two structures were almost identical.[10] When plans for Bridge K0861 were submitted to the Public Roads Administration (PRA) for approval, Chief Engineer C. W. Brown acknowledged the similarity of the two structures:

> It is proposed to use practically the same design for this crossing as was used for Lay Road at Station 920+55 on this route, excepting that all four

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[8]Vaughn Enslow to R. W. Hodson, Signed Letter, 24 April 1939, microfiche copy in "General Correspondence File – Construction Project F-623 B(2)," Collection 12-0392, Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri; and "Preliminary Layout: Bridge No. K0861," 8 April 1941, microfiche copy in "General Correspondence File – Construction Project F-623 A(4)," Collection 12-0392, Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri. Materials held in Collection 12-0392 henceforth cited as part of the "Bridge File."

[9]"Preliminary Layout: Bridge No. K0861," Bridge File; and Vaughn Enlsow to R. W. Hodson, Signed Letter, 30 November 1939, Bridge File.

[10]"Preliminary Layout: Bridge No. K0861," Bridge File.

> wings will be straight on this structure, there being no ramp connecting the two roads. Foundation conditions are virtually the same for both structures.[11]

Federal officials noted that since design constraints for the two bridges were similar, they were not surprised to see that the highway department planned to use similar designs for Bridges K0861 and K0854. The PRA approved the preliminary plans for the McCutcheon Street Bridge in May 1941, and the department was ready to move forward and draw up detailed plans for the new concrete rigid-frame overpass.[12]

Arthur Hayden introduced the concrete rigid-frame design that the highway department selected for Bridge K0861 in the 1920s. Hayden was a New York engineer who designed concrete rigid-frame structures for the Bronx River Parkway, and his designs rapidly won national notoriety. Federally funded work-relief crews often built concrete rigid-frame bridges during the 1930s as they were considered an aesthetically pleasing alternative to other bridge designs. In addition, concrete rigid-frame bridges cost less to build than other structures. Rigid-frame bridges could be built using less steel and concrete than truss bridges, and they required minimal abutments for support.[13]

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[11]C. W. Brown to Clifford Shoemaker, Signed Letter, 16 April 1941, Bridge File. For a comparison of Bridges K0854 and K0861, see Missouri State Highway Department, "Bridge on Lay Road Over US 40TR," microfiche copy available from Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri; and Missouri State Highway Department, "Bridge on McCutcheon Road Over US 40TR." When interstate highway signs were added to the outside of Bridge K0854, it was relabeled Bridge K0854R in highway department records. Bridge K0861 was also relabeled in 1992 when it became Bridge K0861R following a rehabilitation project. See Missouri Highway and Transportation Department, "Job No. J6U0897: Signs 87 and 88, Bridge K0854R," microfiche copy available from Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri; and Missouri Highway and Transportation Department, "Job No. J6U0897: Sign 90, Bridge K0861R."

[12]Clifford Shoemaker to C. W. Brown, Signed Letter, 10 May 1941. To qualify for federal road-building assistance in the 1930s and 1940s, state transportation agencies had to send design plans for new roads and bridges to the Public Roads Administration (PRA) for review. Clifford Shoemaker was the PRA district engineer responsible for reviewing construction projects in Missouri, Kansas, Iowa, and Nebraska, and he needed to approve both preliminary and final plans for the McCutcheon Street Bridge before a contract to build the structure could be let.

[13]Arthur Hayden and Maurice Barron, *The Rigid-Frame Bridge*, 3d ed., (New York: John Wiley and Sons, Inc., 1950), 1-4, 219-229; Clayton Fraser, *Missouri Historic Bridge Inventory: Draft Inventory Report* (Loveland, Colorado: Fraserdesign Inc., 1996), 141; Elmer Napier, "Rigid-Frame Bridges," *Roads and Bridges*, April 1940, 13-14; Eric DeLony, "Merritt Parkway, " HAER No. CT-63, Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, 1992, 79-80; and National Cooperative Highway Research Program, "A Context for Common Historic Bridge Types," NCHRP Project 25-25, Task 15, October 2005, 3.95-3.97.

Concrete rigid-frame bridges quickly became a popular choice among urban expressway designers, and an influential article extolling concrete rigid-frame bridges appeared in an April 1940 construction journal promoting their use in urban situations:

> Rigid-frame bridges are usually more economical to build than other comparative types. Possessing by virtue of their design graceful and pleasing lines, which readily lend themselves to the incorporation of architectural principles in their construction, it is possible to secure a structure infinitely superior, from the aesthetic viewpoint, than previously-accepted types of bridges…they require no expensive ugly superstructure projecting itself above the deck and they are equally satisfactory, as a general rule, when built of reinforced concrete or structural steel.[14]

Despite their national popularity, only a handful of concrete rigid-frame bridges were built as part of Missouri's highway system. The Missouri State Highway Department never developed standard plans for concrete rigid-frame bridges, preferring instead to build simple girder deck-trusses in most situations. However, concrete rigid-frame bridges were used occasionally in Missouri when the situation called for an aesthetically pleasing structure, such as was the case with many of the overpasses built across the Daniel Boone Expressway.[15]

When it was time to create detailed plans for the construction of the McCutcheon Street Bridge, the Missouri State Highway Department ran into an unanticipated problem, a manpower shortage. The highway department's bridge division had been losing designers and engineers to the private sector throughout 1939 and 1940. Many workers were leaving the department to take positions in defense related industries that were beginning to prepare for war, and thus Bridge Engineer N. R. Sack felt compelled to turn to the private sector for assistance in completing design plans for Bridge K0861:

> Last fall I called to your attention the number of men who were leaving this bureau for military service and for other industries connected with the

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[14]Napier, "Rigid-Frame Bridges," 13.

[15] Fraser, *Missouri Historic Bridge Inventory*, 141. Three concrete rigid-frame bridges were built by the Missouri State Highway Department as part of the Daniel Boone Expressway, Bridge K0600 carrying Lindbergh Road, Bridge K0854 carrying Lay Road, and Bridge K0861 carrying McCutcheon Street. Another concrete rigid-frame structure, Bridge K0468, was built to carry Sarah Avenue across the Oakland Express Highway in the City of St. Louis. Bridge K0468 has already been removed and replaced, and the other three concrete rigid-frame bridges will be removed when Highway 40 is upgraded to interstate standards. See Fraser, *Missouri Historic Bridge Inventory*, 141; and Thomas Gubbels, "Historic Documentation, Bridge K0468," April 2002, as held in the Cultural Inventory, Missouri State Historic Preservation Office, Jefferson City, Missouri, *passim*.

> National Defense Program and stated that if this continued it was doubtful if the required bridge designs for our future program could be completed by this bureau. I suggested that it might be necessary to place some of this work with consulting engineers. Designs will be required in the near future for six bridges on Route 40TR, St. Louis County, from Lay Road east. These are one grade separation for McCutcheon Road…With the amount of work which we now have on hand it appears that it will not be possible for us to complete the above designs in order that they may be placed under contract at the desired time. I, therefore, suggest that arrangements be made with Sverdrup and Parcel, Consulting Engineers, of St. Louis, to prepare these designs for us.[16]

Sverdrup and Parcel was a St. Louis-based engineering firm that had been founded by a former highway department employee, Leif Sverdrup. Leif Sverdrup had worked in the 1920s and early 1930s as a highway department bridge designer and engineer, and he maintained close ties to the Missouri State Highway Department after he entered the private sector.[17] No formal contract was signed between Sverdrup and Parcel and the highway department for Bridge K0861. Instead, an informal agreement was struck where Sverdrup and Parcel would receive a fee of 3.5 percent of the estimated total costs of building the bridge for its design services.[18]

Although Bridge K0861 was to be similar to Bridge K0854, the Missouri State Highway Department did not want the two structures to be identical. Instead, the highway department hoped to vary the appearances of the two bridges slightly, asking Sverdrup and Parcel to "give some attention to architectural details for the McCutcheon Road Bridge and vary them somewhat so they will not be too much like those used for Lay Road."[19] Sverdrup and Parcel responded by offering several different design treatments for the concrete that would be used to construct the McCutcheon Street

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[16]N. R. Sack to C. W. Brown, Signed Letter, 8 April 1941, microfiche copy in "General Correspondence File – Construction Project F-623 A(4)," Collection 12-0392, Bridge Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri.

[17]Thomas Gubbels, "Hermann Bridge," HAER No. MO-114, Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, 2005, 26. For more information on Leif Sverdup and the worldwide influence of his engineering company, see Gregory Franzwa, *Legacy: The Sverdrup Story* (St. Louis: Sverdrup Corporation, 1978), *passim*; and Gregory Franzwa and William Ely, *Leif Sverdrup: Engineer Soldier at His Best* (Gerald, Missouri: Patrice Press, 1980), *passim*.

[18]Leif Sverdrup to N. R. Sack, Signed Letter, 17 September 1941, Bridge File; and N. R. Sack to Leif Sverdrup, Signed Letter, 18 September 1941, Bridge File.

[19]N. R. Sack to Sverdrup and Parcel, Signed Letter, 1 July 1941, Bridge File.

Bridge. The highway department ultimately selected an aesthetic plan known as "Study B" for the new structure. Study B called for abstract emblems on the spandrels of Bridge K0861 and decorative concrete elements along the bridge abutments and central pier. In contrast, Bridge K0854, which was designed internally by the Missouri State Highway Department, featured almost no aesthetic enhancements.[20] Sverdrup and Parcel submitted design plans for Bridge K0861 to the highway department in September 1941, and after some minor alterations, the department received finalized plans in November 1941. Sverdrup and Parcel was ultimately paid $2,607.90 for its design services, and in early December 1941, the plans for Bridge K0861 were submitted to the PRA for their approval.[21] It appeared that the Missouri State Highway Department would soon be able to hire a contractor to build the McCutcheon Street Bridge, but world events delayed its construction for several years.

On December 7, 1941, Japanese forces struck the U.S. Naval Base at Pearl Harbor, Hawaii, drawing the United States into the Second World War. The federal government immediately took steps to refocus the national economy toward wartime production and to secure critical materials for the war effort. A microcosm of the federal response to the attack on Pear Harbor can be seen in the response of Clifford Shoemaker, a regional engineer for the PRA, to the plans that he received from the Missouri State Highway Department for Bridge K0861. After examining the plans for this and another structure, Shoemaker asked the highway department to redesign the McCutcheon Street Bridge so it could be built without using any materials that might be needed for America's war effort:

> The designs of both structures appear to be generally satisfactory. There are, however, certain critical materials used in small quantities for which we recommend that non-critical materials be substituted. These materials include rubber compound in the expansion joints of both bridges for which a bituminous material could be used. In the expansion joints of the arch

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[20]N. R. Sack to E. R. Grant, Signed Letter, 29 July 1941, Bridge File; and Missouri State Highway Department, "Bridge on McCutcheon Road Over US 40TR."

[21]N. R. Sack to B. R. Smith, Signed Letter, 30 September 1941, Bridge File; Clifford Shoemaker to C. W. Brown, Signed Letter, 31 December 1941, Bridge File, and Sverdrup and Parcel, "Statement of Account with Missouri State Highway Department, Jefferson City, MO [sic], For Professional Services," 5 December 1941, Bridge File. One minor problem encountered by Sverdrup and Parcel during the design of the McCutcheon Street Bridge was aligning the structure with the Daniel Boone Expressway. N. R. Sack, the highway department's Bridge Engineer, observed, "the adjacent pavement is being built by the W.P.A. and, apparently, not entirely according to information on which our plans were based." Because of the carelessness of W.P.A. construction workers, Sverdrup and Parcel had to redesign the curbing along Bridge K0861 so it would align properly with the expressway. See N. R. Sack to E. R. Grant, Signed Letter, 29 July 1941, Bridge File.

> bridge there are copper seals which perhaps could be eliminated altogether. Drain pipes behind the abutments of the rigid frame structure consist of 8" corrugated metal pipe which is specified to be galvanized. Vitrified clay pipe has been used in the past for this purpose and may be substituted for the galvanized material. Galvanized conduit is provided for a lighting system. A type of conduit may be used which need not be galvanized.[22]

In addition, Shoemaker informed the highway department that his superiors had told him not to approve any new construction projects until military officials had examined them and determined whether or not the project was critical to the war effort. Thus, Shoemaker decided to hold the plans for Bridge K0861 at his office in Kansas City without acting on them.[23] Highway department designers worked on the plans for K0861 in January 1942 removing critical war materials from the bridge design.[24] The reformulated plans for the McCutcheon Street Bridge sat on the shelf for two years until the federal government allowed the project to move forward.

Soon after the United States entered the Second World War, the PRA announced a strict new policy regarding state-sponsored road and bridge construction. The PRA determined that it would not allow construction to proceed on any highways that were not part of the National Defense System. The National Defense System consisted of highways considered critical to moving men and materiel across the nation, and these military-designated roads would be the only ones improved during the war. Several roads in Missouri were designated as National Defense highways, including Route 40TR.[25]

In the spring of 1944, the highway department received permission to dust off its plans for the McCutcheon Street Bridge and hire a contractor to build the structure. As

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[22]Clifford Shoemaker to C. W. Brown, Signed Letter, 31 December 1941, Bridge File. The Missouri State Highway Department also submitted plans for a standard steel stringer bridge across the Des Peres River along with the plans for Bridge K0861, and Shoemaker's recommendations applied to both structures.

[23]*Ibid.*

[24]C. W. Brown to Clifford Shoemaker, Signed Letter, 20 January 1942, Bridge File.

[25]Missouri State Highway Commission, *Thirteenth Biennial Report of the State Highway Commission of Missouri for the Period Ending December 31, 1942* (Jefferson City, Missouri: Missouri State Highway Commission, 1943), 22-25. Other Missouri roads designated by the federal government as National Defense highways included U.S. Highway 71 near Kansas City and U.S. Highway 66 near Fort Leonard Wood.

the Missouri State Highway Commission explained in a report to the General Assembly, the PRA allowed only a handful of bridge projects to move forward during the war:

> During this biennium [1943-1944], necessities of war have limited very materially, the design, construction and maintenance of state highway bridges. Limited personnel has also somewhat handicapped these primary functions of this bureau. Only where emergencies existed, or where bridges were needed to improve the strategic network of highways, or to provide access to war plants and army camps, has any actual bridge construction been carried on. Even in these instances, critical materials have been spared as far as practical. Progress has, however, been made on the post war program.[26]

On July 7, 1944, bids for the construction of Bridge K0861 were opened, and the lowest bid was submitted by the Israel Brothers Construction Company of Clayton, Missouri. The Israel Brothers submitted a bid of $74,136 for the project, a bid that was more than $6,000 lower than its closest competitor.[27] Work began on the construction of Bridge K0861 in the summer of 1944, but due to delays caused by wartime exigencies, the overpass did not open to traffic until 1946.

Several problems plagued the Israel Brothers Construction Company slowing progress on the McCutcheon Street Bridge. By September 1944 the company had excavated several holes for the piles and footings that would support the bridge, but they were unable to move forward due to ongoing debates between the highway department and the PRA over how large the footings needed to be to handle anticipated traffic

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[26]Missouri State Highway Commission, *Fourteenth Biennial Report of the State Highway Commission of Missouri for the Period Ending December 31, 1944* (Jefferson City, Missouri: Missouri State Highway Commission, 1945), 139. Although the Missouri State Highway Department built few roads or bridges during the Second World War, the department's planning division continued to study the state's highway system and draw up plans to manage Missouri's roads during the postwar era. For a detailed discussion of the impact of the Second World War on the daily operations of the highway department, see Missouri State Highway Commission, *Thirteenth Biennial Report of the State Highway Commission of Missouri for the Period Ending December 31, 1942*, *passim*; Missouri State Highway Commission, *Fourteenth Biennial Report of the State Highway Commission of Missouri for the Period Ending December 31, 1944*, *passim*; and Missouri State Highway Commission, *Fifteenth Report of the State Highway Commission of Missouri for the Period January 1, 1945 to June 30, 1946* (Jefferson City, Missouri: Missouri State Highway Commission, 1946), *passim*.

[27]Missouri State Highway Commission, "Tabulation of Bids: Federal Aid Project FA 623-B(2)," microfiche copy available from Design Division, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri.

loads.[28] By spring 1945, the Israel Brothers Construction Company was ready to pour the concrete arches for Bridge K0861, but as area engineer Robert Hodson observed, wartime labor shortages threatened to slow progress on the bridge:

> Kindly be advised that the contractor on the above-mentioned project has resumed bridge work but his progress seems to be limited [due] to the number of employees he has been able to secure to date. He has advised that he is considerably short of laborers and so far has been unable to secure them. He also advised that he is required to pay $1.00 per hour for the few he has been able to secure.[29]

In response to this labor shortage, the construction company asked the highway department if there was any way it could use German prisoners of war interred in Missouri as general laborers on the bridge project. The highway department responded that such a request for prison labor would need to go through proper federal channels, and it was the department's opinion that "such a request will not materialize as it is too involved."[30] By July 1945, the Israel Brothers Construction Company had finished pouring the concrete arches, abutments, and central piers for Bridge K0861 and were ready to begin work on the roadbed.[31] Final work on the bridge was completed in the spring of 1946, and the new structure was accepted into the state highway system on May 15, 1946.[32]

Following the end of the Second World War, construction work resumed along the Daniel Boone Expressway. The new expressway was completed in the late 1940s, and in the 1950s the expressway was linked to the Oakland Express Highway in the City of St. Louis. This new route, dubbed U.S. Highway 40, provided the means for metropolitan residents to live in suburban neighborhoods while working in the city, thus encouraging

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[28]J. J. Corbett to Clifford Shoemaker, Signed Letter, 18 September 1944, Bridge File; and Robert Hodson to J. J. Corbett, Signed Letter, 6 October 1944, Bridge File.

[29]Robert Hodson to J. J. Corbett, Signed Letter, 6 April 1945, Bridge File. Robert Hodson was the Division Engineer in charge of the highway department's St. Louis-area district, which was based in Kirkwood, Missouri. Hodson's office oversaw progress on all construction projects in the St. Louis metropolitan area and served as a mediator between construction contractors and Missouri State Highway Department officials in Jefferson City.

[30]*Ibid.*

[31]R. O. Boekemeier to W. L. Chandler, Signed Letter, 17 July 1945, Bridge File; and Robert Hodson to R. O. Boekemeier, Signed Letter, 20 July 1945, Bridge File.

[32]C. W. Brown to Robert Hodson, Signed Letter, 21 July 1946, Bridge File.

the rapid growth of suburban communities. As one journalist recently observed, "subdivisions and businesses grow along Highway 40 like trees and flowers grow alongside a stream," and some of the most expensive homes and prosperous businesses in the St. Louis metropolitan area are located along suburban segments of the highway.[33]

Unfortunately, U.S. Highway 40 became a victim of its own success. The highway spurred the flight of St. Louis-area residents away from the urban core, and the road now carries substantially more traffic than it was designed to accommodate. As early as the mid-1960s the Missouri State Highway Department realized that traffic congestion was causing significant delays on Highway 40, and the department warned, "unless the operational characteristics of the study section [of Highway 40] are improved, future increases in vehicular density and congestion seem inevitable."[34]

Today, plans are being prepared to rebuild U.S. Highway 40 in suburban St. Louis and upgrade the facility to interstate highway standards. The rebuilt expressway will be known as Interstate 64, and the McCutcheon Street Bridge will be replaced with a structure that meets federal interstate standards. Bridge K0861 has functioned in place since 1946 with only minor alterations. In 1992 portions of the bridge's concrete were ground down in order to install new signs, but no major changes were made to the superstructure.[35] Bridge K0861R will be demolished sometime in early 2007, and another concrete rigid-frame bridge will disappear from Missouri's landscape.

II. Construction Contractors

A. Sverdrup and Parcel

The engineering firm of Sverdrup and Parcel dramatically influenced the built environment of twentieth century Missouri by designing numerous structures and buildings for governmental and private customers. Leif Sverdrup, the founder of Sverdrup and Parcel, was born in Norway in 1898 and immigrated to the United States in 1915. He studied engineering at Augsburg College and the University of Minnesota, and in 1922 he accepted a position as a designer with the Missouri State Highway

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[33]Tipton, "The Way West: Highway 40 Grew in Fits and Starts Over 60 Years," 1A.

[34]Missouri State Highway Department, *Peak Hour Traffic and Congestion on U.S. Route 40, Daniel Boone Expressway, St. Louis, Missouri* (Jefferson City, Missouri: Missouri State Highway Department, 1965), 3.

[35]Missouri Highway and Transportation Department, "Job No. J6U0897: Sign 90, Bridge K0861R." Once installation of the new signs was completed, Bridge K0861 was relabeled Bridge K0861R in the highway department's bridge inventory.

Department. Sverdrup later became head of the department's Bureau of Bridges, overseeing and approving all state-sponsored bridge projects in Missouri. Sverdrup left public service in 1928 to form Sverdrup and Parcel with his college mentor, John Parcel. Company headquarters were established in St. Louis, and the founders set out to find work for the new firm. The first structure designed by the fledgling company was the Hermann Bridge across the Missouri River, and the commission received for designing this structure kept Sverdrup and Parcel viable during the lean years of the Great Depression.[36] Sverdrup and Parcel eventually designed several bridges for the highway department in addition to the McCutcheon Street Bridge, including the Poplar Street Bridge and the Blanchette Bridge across the Mississippi River in St. Louis.[37]

During the Second World War, Leif Sverdrup served in the U.S. Army Corps of Engineers, building airstrips and military installations throughout the Pacific theater. After the Second World War ended, Sverdrup and Parcel expanded to become a comprehensive design firm providing engineering, architectural, and planning services for all types of construction projects. Sverdrup's military connections helped secure numerous projects for his consulting firm, including the trans-Arabian pipeline and the U.S. Air Force's Arnold Engineering Development Center. Sverdrup and Parcel also designed many of St. Louis' signature sites, including Busch Memorial Stadium and the Mississippi River Flood Wall. Leif Sverdrup died in January 1976, but his firm continued to provide comprehensive design and engineering services after his death. Sverdrup and Parcel merged in 1999 with Jacobs Engineering of Pasadena, California, becoming part of Jacobs' technology division.[38]

B. Israel Brothers Construction Company

Archival research yielded minimal information about the company that built the McCutcheon Street Bridge, the Israel Brothers Construction Company of Clayton, Missouri. The forerunner of the Israel Brothers Construction Company, the Stolle Stone Company, was founded in St. Louis in 1899. The Stolle Stone Company was a joint venture between Casper, William, and Conrad Stolle. The company initially held capital

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[36]The Hermann Bridge was documented for the Historic American Engineering Record in HAER No. MO-114. See Gubbels, "Hermann Bridge," *passim*.

[37]Franzwa, *Legacy*, 3-14; Gubbels, "Hermann Bridge," 26-27; and David Austin, "Gasconade Bridge," HAER No. MO-82, Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, 1994, 9.

[38]Austin, "Gasconade Bridge," 10; Franzwa, *Legacy*, *passim*; City of St. Louis, Missouri, "Mound City of the Mississippi, a St. Louis History: Sverdrup, Leif," downloaded 14 April 2006 from http://stlcin.missouri.org/history/peopledetail.cfm?Master_ID=1737; and Jacobs Engineering Group, "History," downloaded 14 April 2006 from http://www.jacobs.com/aboutus/history.asp.

worth $10,000, and the stated purpose for forming the company was, "quarrying, sawing and dressing stone, to buy sell and improve quarry property for the furtherance of the company and to do a general contracting business."[39] The Stolle Stone Company changed its name in January 1928 to the Glendale Construction Company, and two years later, it became the Israel Brothers Construction Company under the leadership of company president Clyde Israel.[40]

The Israel Brothers Construction Company submitted bids to the Missouri State Highway Department for several projects involved with the construction of U.S. Highway 40TR through the St. Louis area, but the only contract the company received was for Bridge K0861. In the years following the end of the Second World War, the Israel Brothers Construction Company worked on a number of highway department projects in St. Louis County, including State Route EE, Highway 140, and Highway 340.[41] These three highway spurs supplemented U.S. Highway 40 and helped ease traffic congestion throughout the St. Louis metropolitan area.

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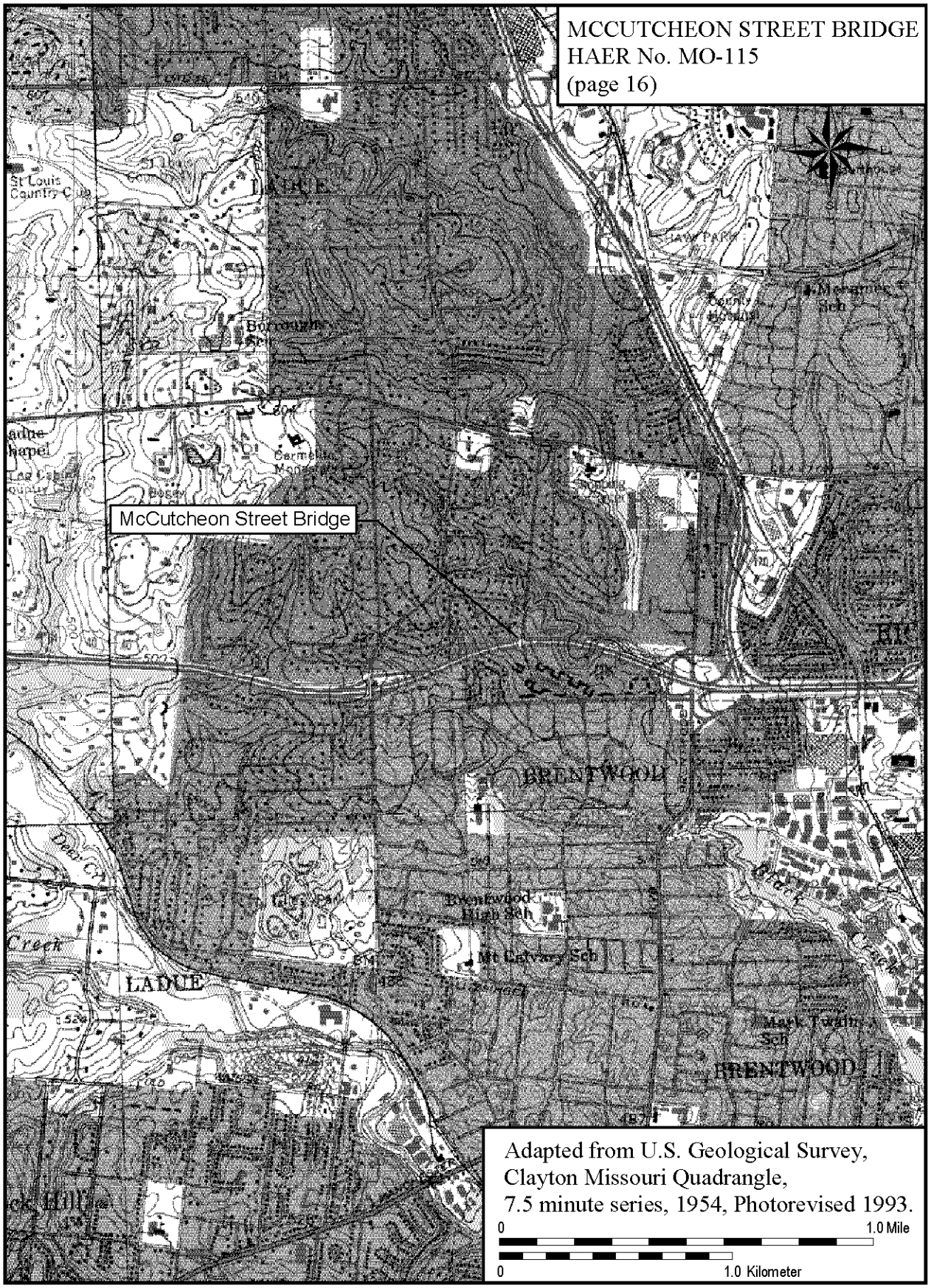
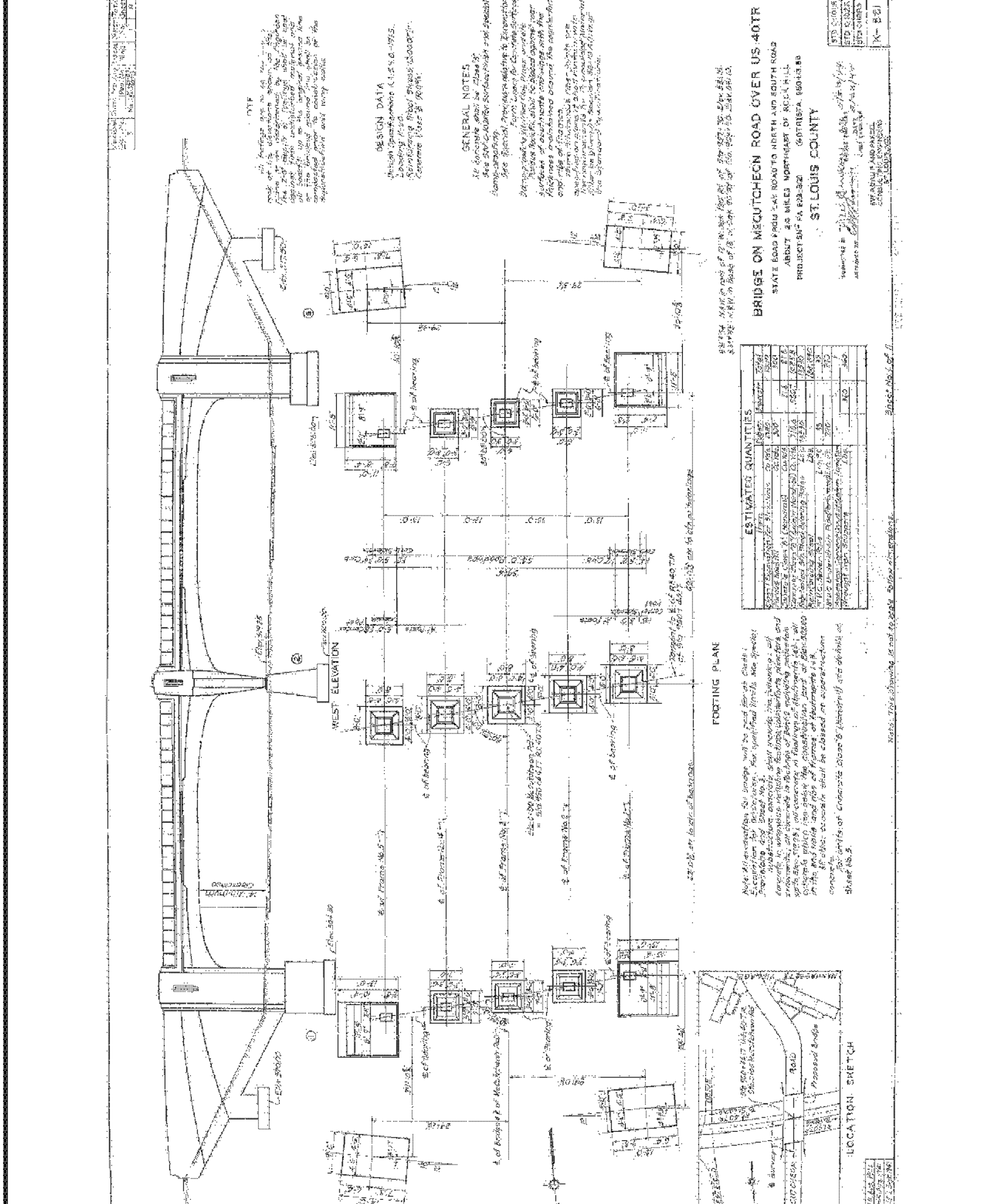
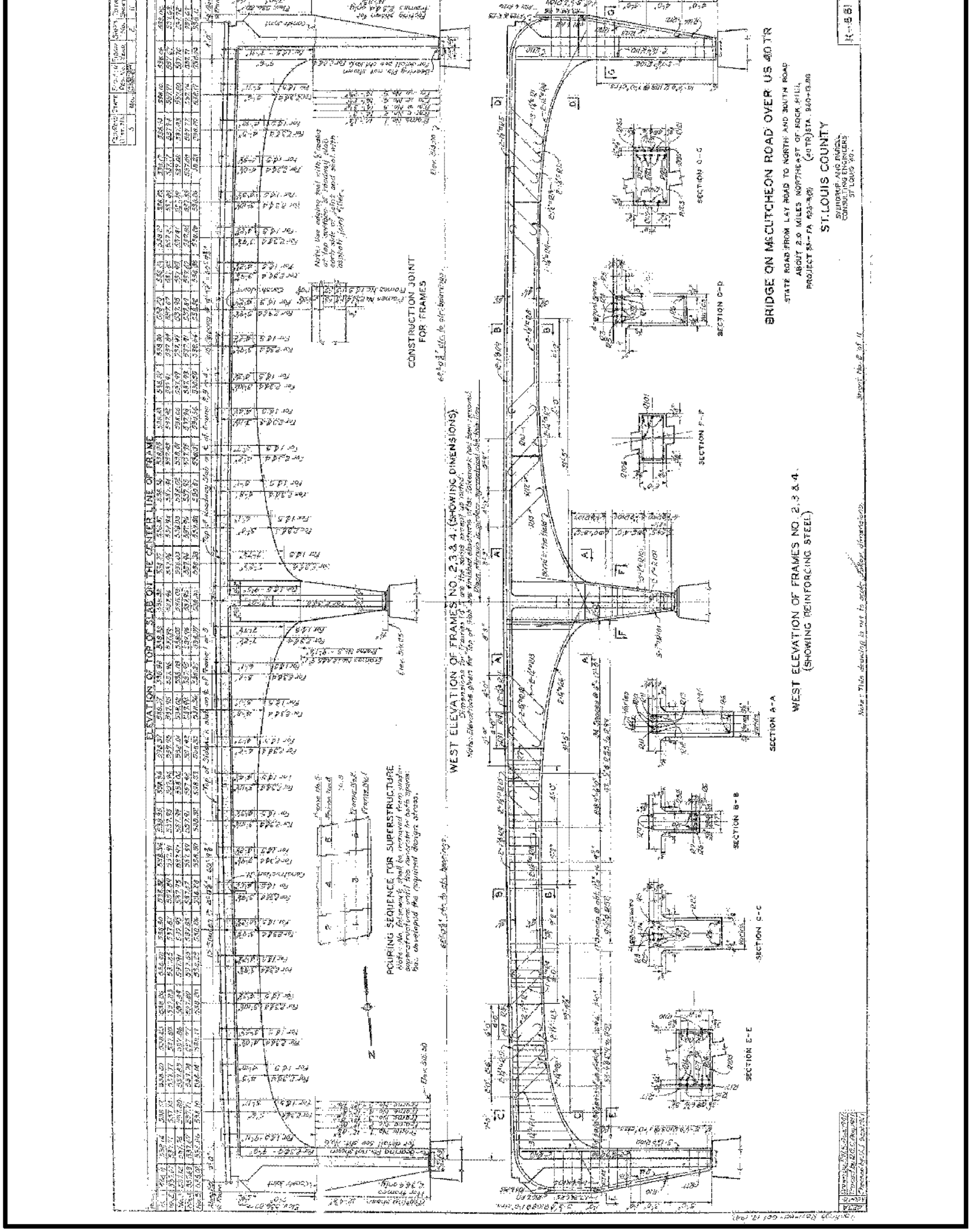
[39]Stolle Stone Company, "Articles of Incorporation," 10 March 1899, as held by the Missouri Secretary of State Corporations Office, Jefferson City, Missouri.

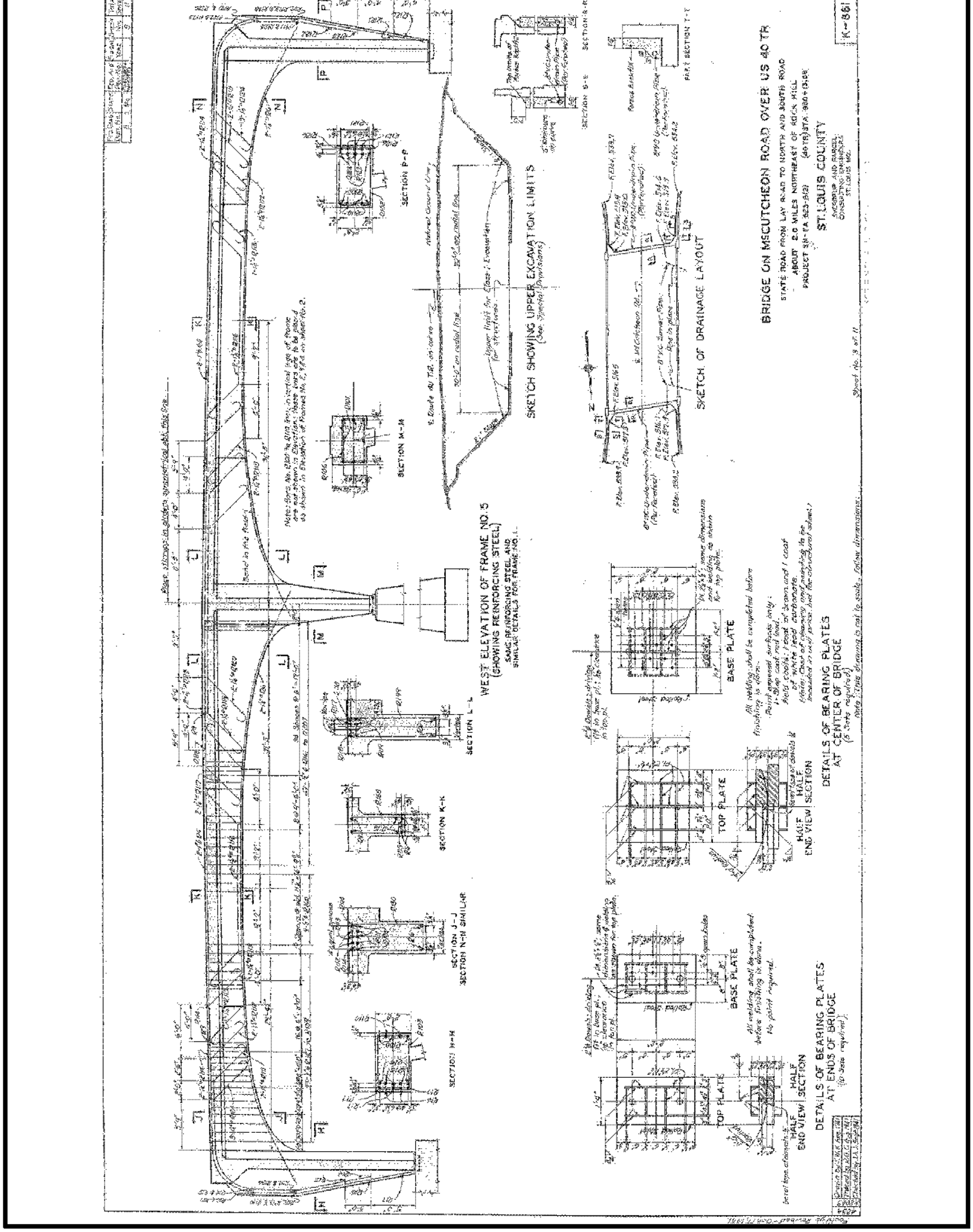
[40]Missouri Secretary of State, "Certificate of Amendment: Stolle Stone Company," 12 January 1928, as held by the Missouri Secretary of State Corporations Office, Jefferson City, Missouri; and Missouri Secretary of State, "Certificate of Amendment: Glendale Construction Company," 10 July 1930, as held by the Missouri Secretary of State Corporations Office, Jefferson City, Missouri.

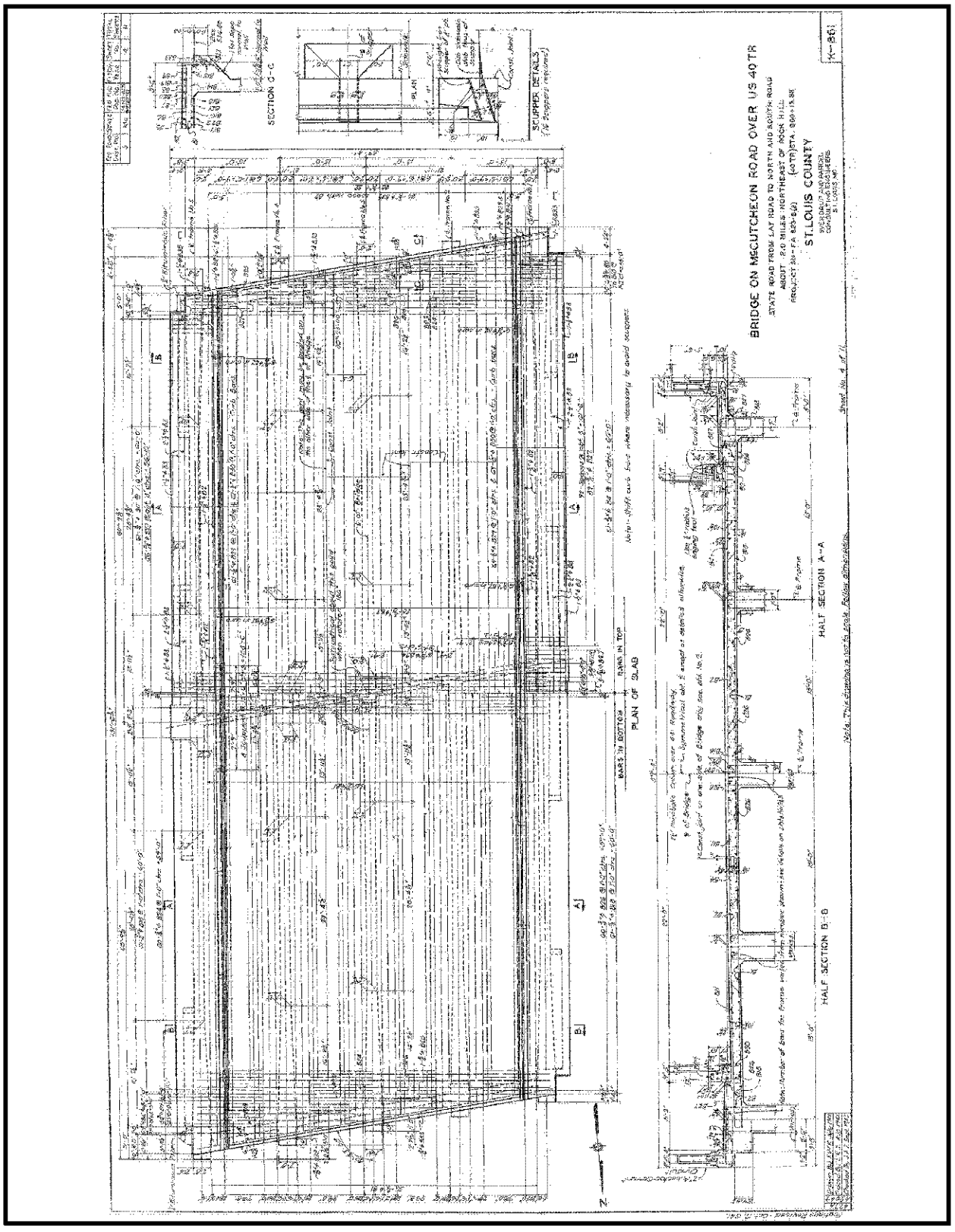
[41]Missouri State Highway Commission, "Minutes of the Regular September Meeting of the State Highway Commission, Held in Jefferson City, Missouri, Tuesday, September 13, 1949," as held by the Secretary to the Missouri State Highway Commission, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri, 21; Missouri State Highway Commission, "Minutes of Special Highway Commission Meeting Held in Kansas City, Missouri, On Monday and Tuesday, July 15-16, 1963," as held by the Secretary to the Missouri State Highway Commission, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri, 74; and Missouri State Highway Commission, "Minutes of Special Highway Commission Meeting Held in Jefferson City, Missouri, On Thursday and Friday, December 16-17, 1965," as held by the Secretary to the Missouri State Highway Commission, Missouri Department of Transportation General Headquarters, Jefferson City, Missouri, 24, 26.

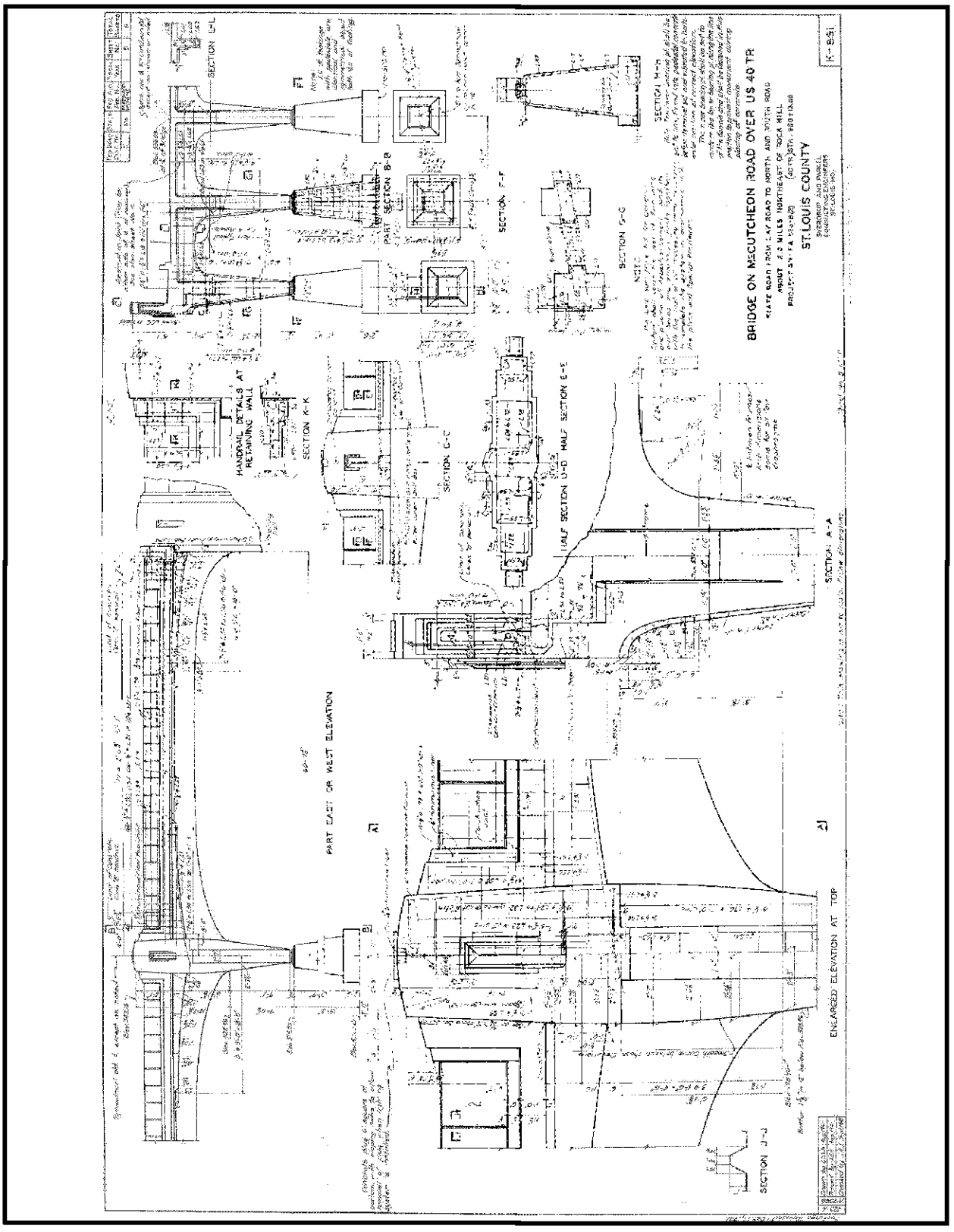

MCCUTCHEON STREET BRIDGE
HAER No. MO-115
(page 16)
McCutcheon Street Bridge
LADUE
BRENTWOOD
Adapted from U.S. Geological Survey,
Clayton Missouri Quadrangle,
7.5 minute series, 1954, Photorevised 1993.
0
1.0 Mile
0
1.0 Kilometer

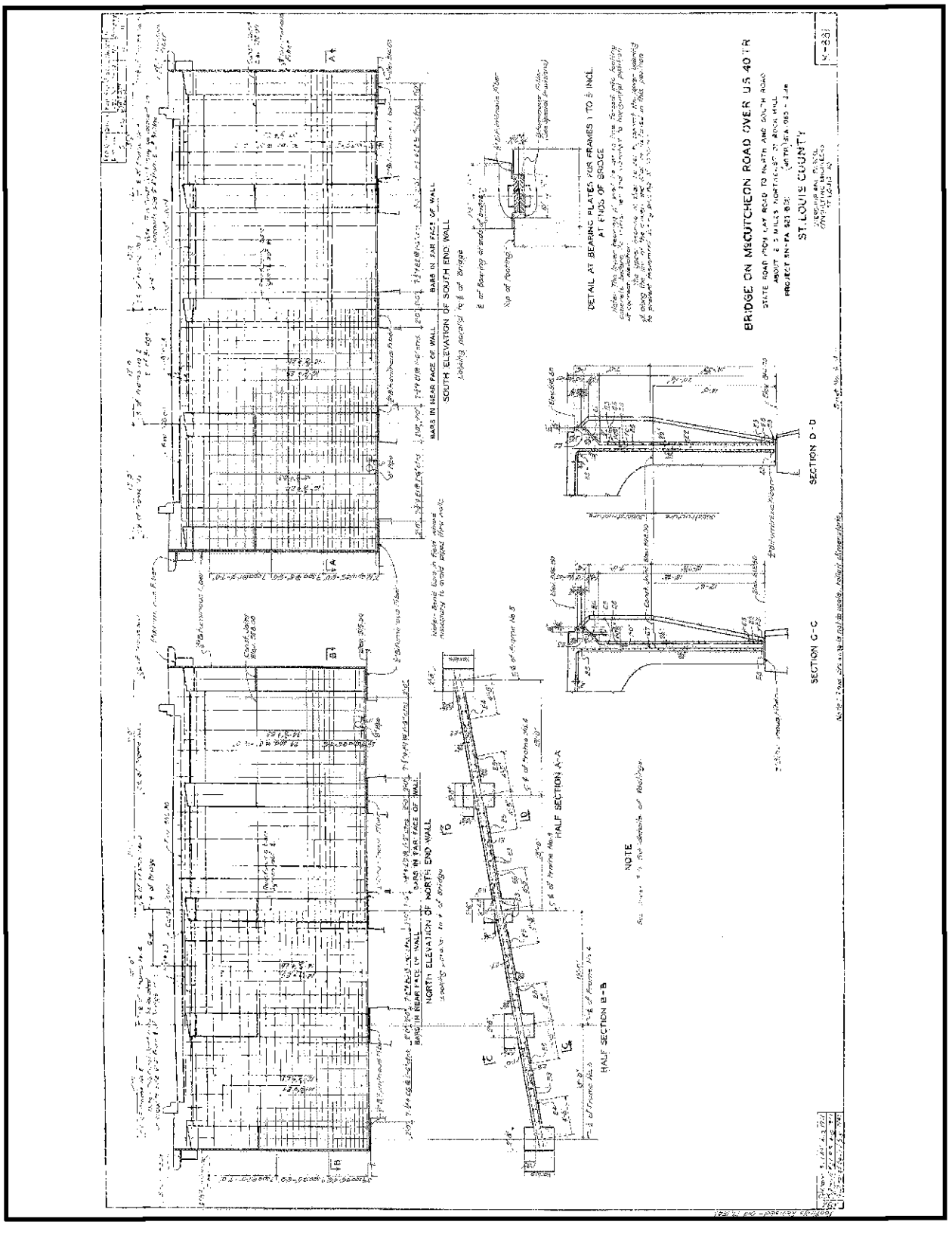

WEST ELEVATION
FOOTING PLAN
LOCATION SKETCH
ESTIMATED QUANTITIES
DESIGN DATA
GENERAL NOTES
BRIDGE ON McCUTCHEON ROAD OVER US-40TR
ST. LOUIS COUNTY

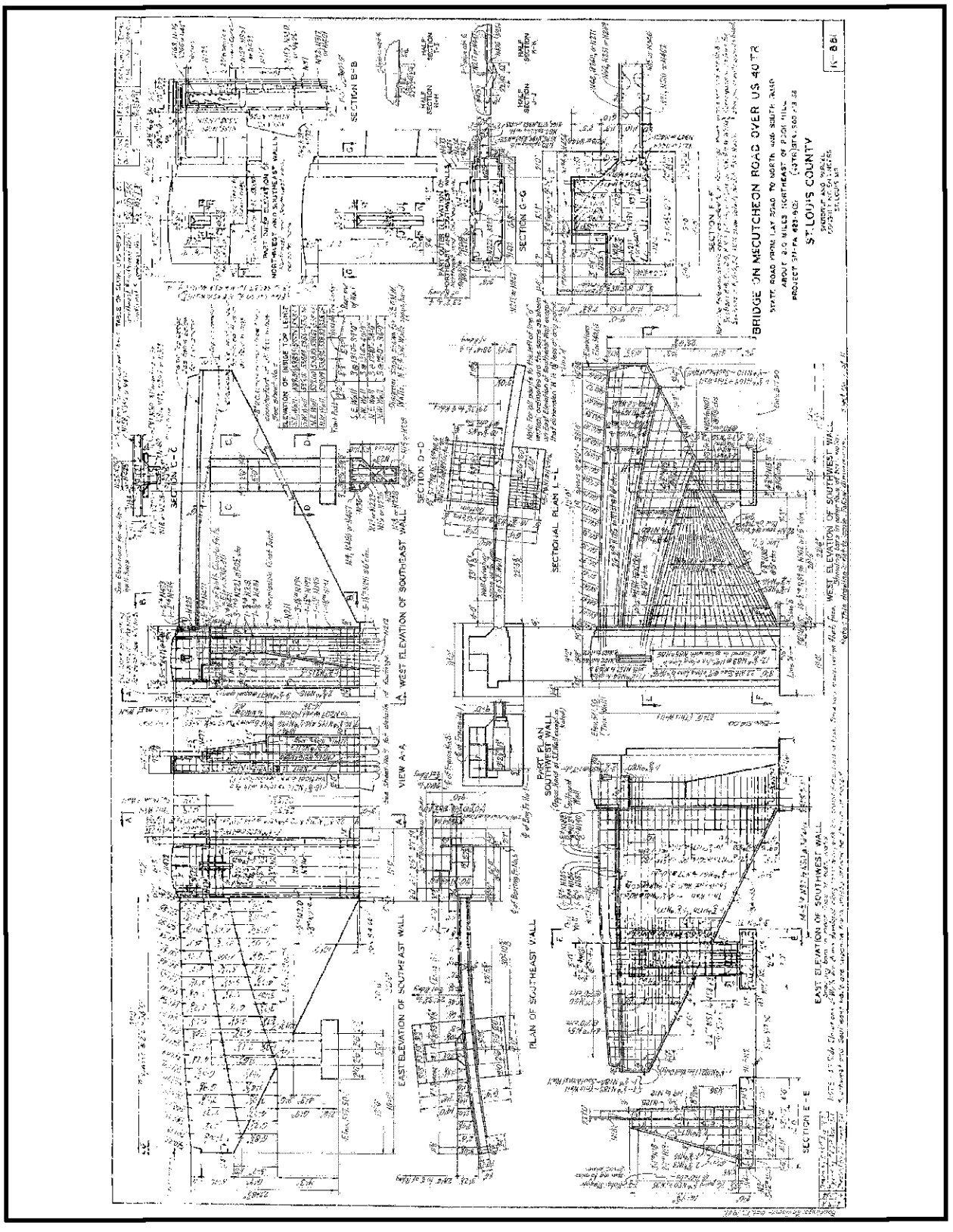

ELEVATION OF TOP OF SLAB ON THE CENTER LINE OF FRAME
CONSTRUCTION JOINT FOR FRAMES
POURING SEQUENCE FOR SUPERSTRUCTURE
WEST ELEVATION OF FRAMES NO. 2,3 & 4 (SHOWING DIMENSIONS)
WEST ELEVATION OF FRAMES NO. 2,3 & 4 (SHOWING REINFORCING STEEL)
SECTION A-A
SECTION B-B
SECTION C-C
SECTION E-E
SECTION F-F
SECTION D-D
SECTION G-G
BRIDGE ON McCUTCHEON ROAD OVER US 40 TR
ST. LOUIS COUNTY

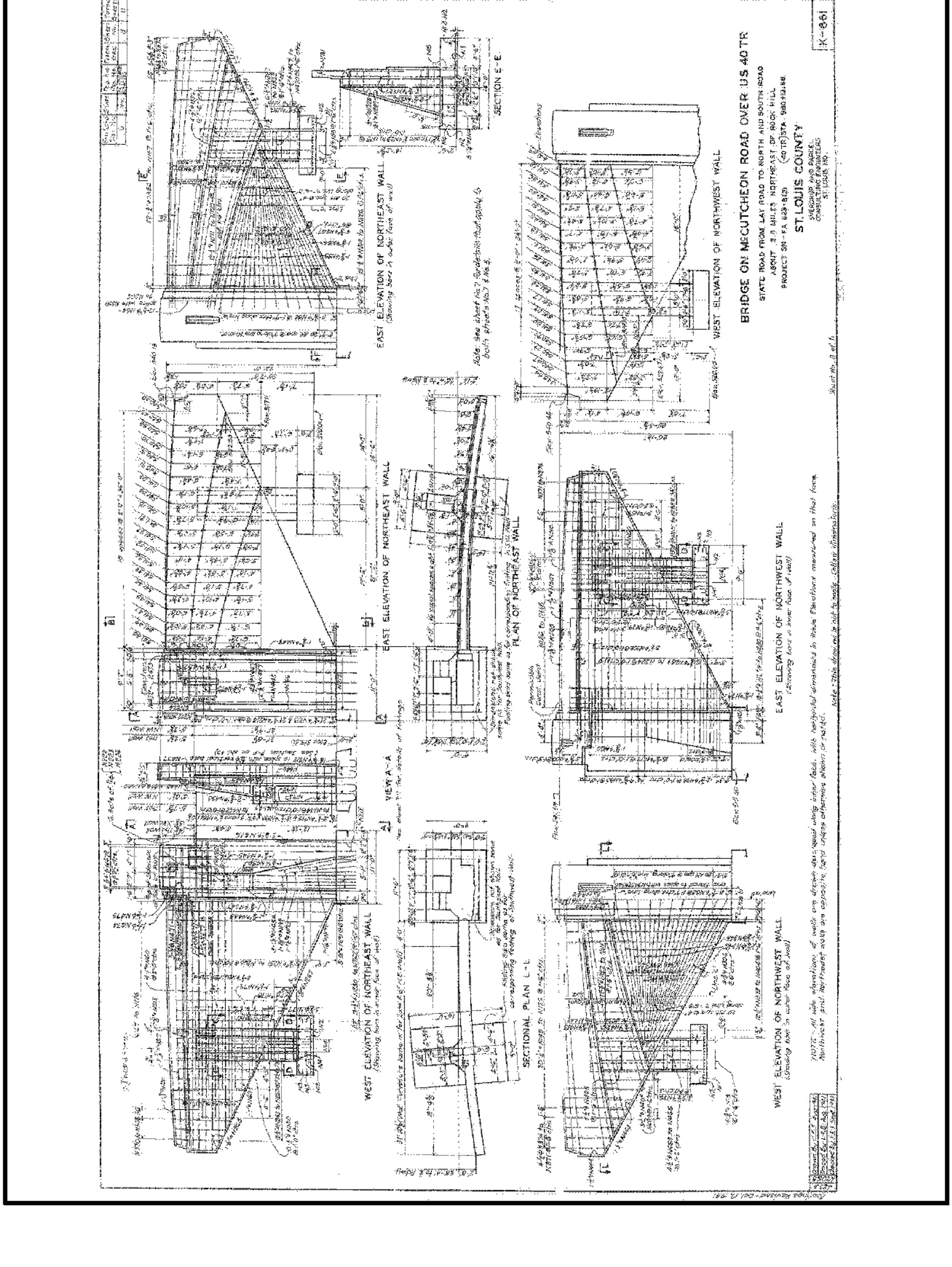

BRIDGE ON McCUTCHEON ROAD OVER US 40 TR
ST. LOUIS COUNTY
WEST ELEVATION OF FRAME NO. 5
(SHOWING REINFORCING STEEL)
SKETCH SHOWING UPPER EXCAVATION LIMITS
SKETCH OF DRAINAGE LAYOUT
DETAILS OF BEARING PLATES AT CENTER OF BRIDGE
DETAILS OF BEARING PLATES AT ENDS OF BRIDGE
TOP PLATE
BASE PLATE
HALF END VIEW
HALF SECTION
SECTION H-H
SECTION J-J
SECTION K-K
SECTION L-L
SECTION M-M
SECTION P-P
K-861

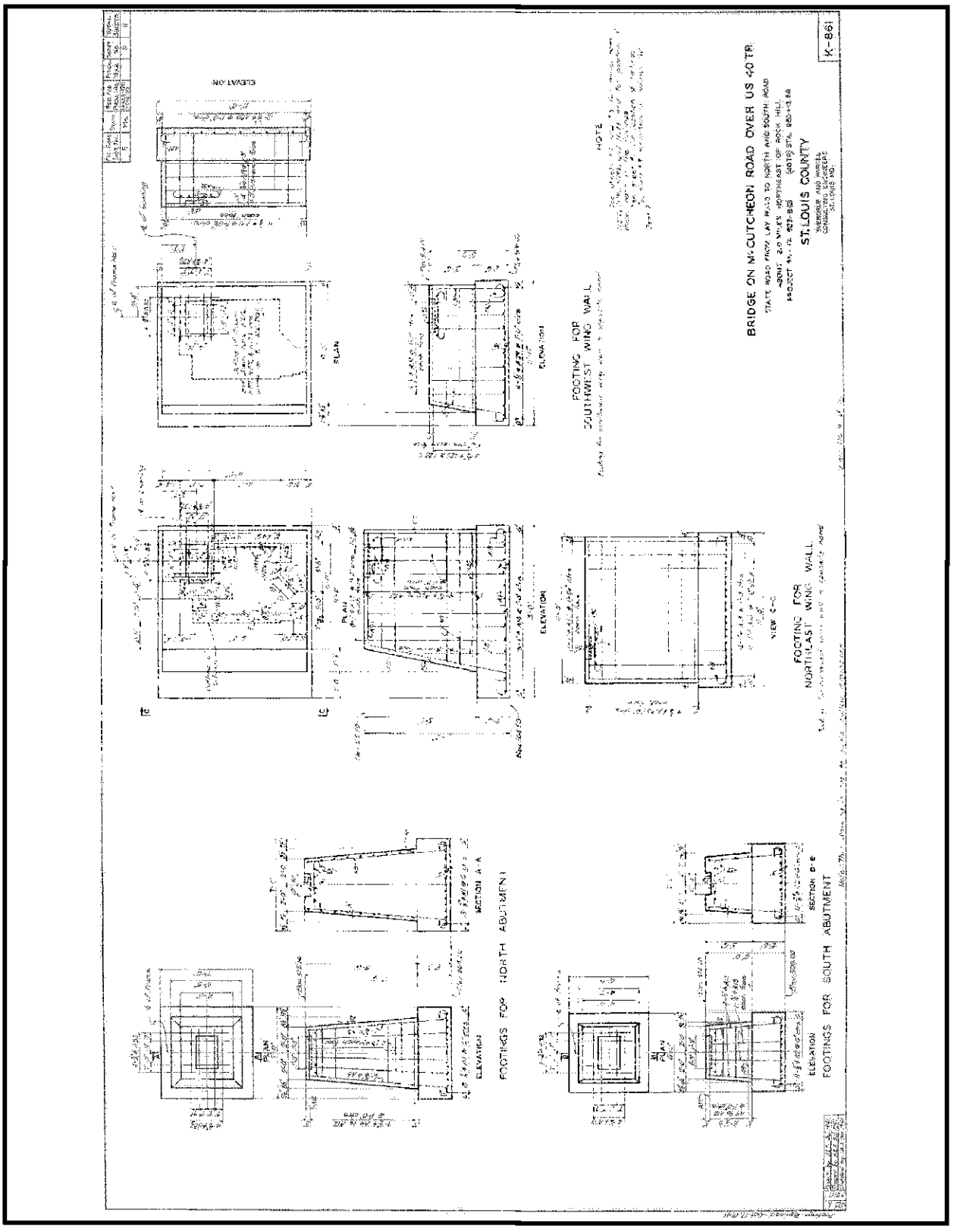

BRIDGE ON MCCUTCHEON ROAD OVER US 40 TR
STATE ROAD FROM LAY ROAD TO NORTH AND SOUTH ROAD
ABOUT .8 MILES NORTHEAST OF ROCK HILL
ST. LOUIS COUNTY
SECTION C-C
SCUPPER DETAILS
PLAN OF SLAB
HALF SECTION A-A
HALF SECTION B-B

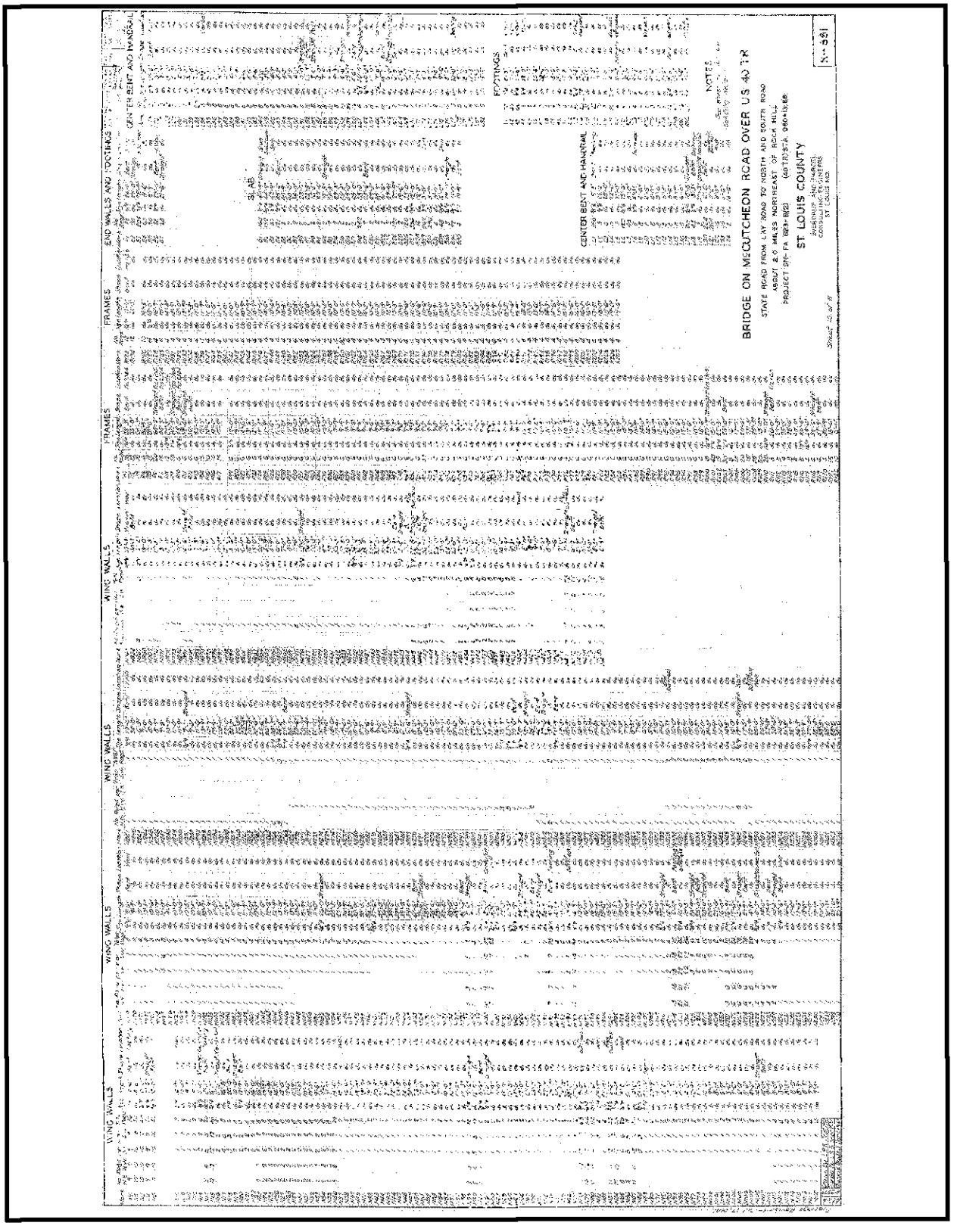

BRIDGE ON McCUTCHEON ROAD OVER US 40 TR
ST. LOUIS COUNTY
PART EAST OR WEST ELEVATION
ENLARGED ELEVATION AT TOP
HALF SECTION C-D
HALF SECTION E-E
SECTION A-A
SECTION B-B
SECTION F-F
SECTION G-G
SECTION J-J
SECTION K-K
HANDRAIL DETAILS AT RETAINING WALL

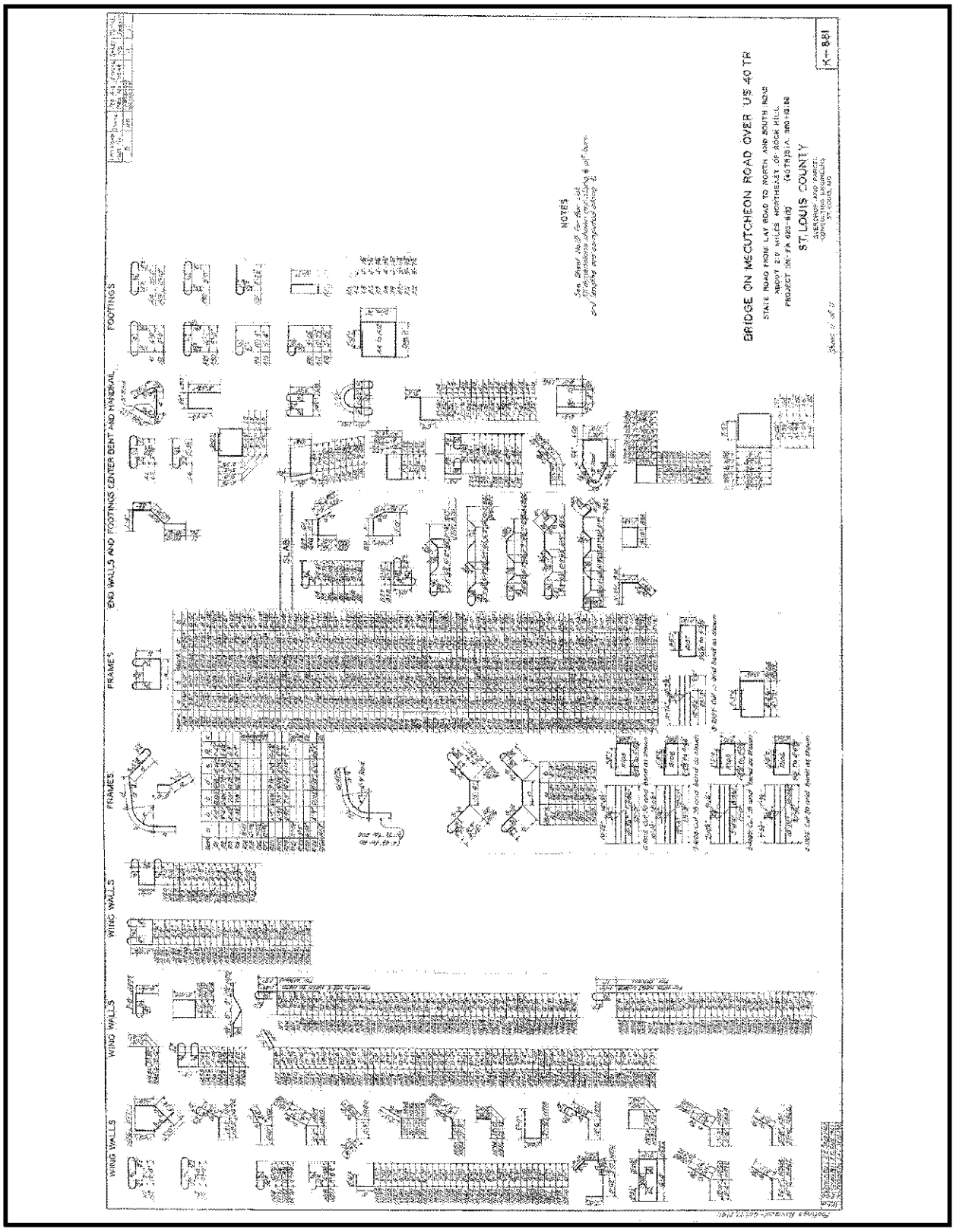

BRIDGE ON MCCUTCHEON ROAD OVER U.S. 40 TR
ST. LOUIS COUNTY
SECTION D-D
SECTION C-C
DETAIL AT BEARING PLATES FOR FRAMES 1 TO 6 INCL AT ENDS OF BRIDGE
SOUTH ELEVATION OF SOUTH END WALL
NORTH ELEVATION OF NORTH END WALL
HALF SECTION A-A
HALF SECTION B-B
NOTE


BRIDGE ON MCCUTCHEON ROAD OVER US 40 TR
ST. LOUIS COUNTY
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTIONAL PLAN L-L
VIEW A-A
WEST ELEVATION OF SOUTHEAST WALL
EAST ELEVATION OF SOUTHEAST WALL
PLAN OF SOUTHEAST WALL
PART PLAN SOUTHWEST WALL
WEST ELEVATION OF SOUTHWEST WALL
EAST ELEVATION OF SOUTHWEST WALL


BRIDGE ON McCUTCHEON ROAD OVER U.S. 40 TR
ST. LOUIS COUNTY
K-881
EAST ELEVATION OF NORTHEAST WALL
SECTION E-E
WEST ELEVATION OF NORTHWEST WALL
EAST ELEVATION OF NORTHEAST WALL
PLAN OF NORTHEAST WALL
VIEW A-A
WEST ELEVATION OF NORTHEAST WALL
SECTIONAL PLAN L-L
EAST ELEVATION OF NORTHWEST WALL
WEST ELEVATION OF NORTHWEST WALL


BRIDGE ON McCUTCHEON ROAD OVER U.S. 40 TR.
ST. LOUIS COUNTY
K-861
FOOTING FOR SOUTHWEST WING WALL
FOOTING FOR NORTHEAST WING WALL
FOOTINGS FOR NORTH ABUTMENT
FOOTINGS FOR SOUTH ABUTMENT
ELEVATION
PLAN
SECTION A-A
SECTION B-B


BRIDGE ON MCCUTCHEON ROAD OVER US 40 TR
STATE ROAD FROM LAY ROAD TO NORTH AND SOUTH ROAD
ABOUT 2.0 MILES NORTHEAST OF ROCK HILL
ST LOUIS COUNTY
NOTES
FOOTINGS
SLAB
END WALLS AND FOOTINGS
CENTER BENT AND HANDRAIL
FRAMES
WING WALLS


BRIDGE ON MCCUTCHEON ROAD OVER US 40 TR
STATE ROAD FROM LAY ROAD TO NORTH AND SOUTH ROAD
ABOUT 2.0 MILES NORTHEAST OF ROCK HILL
ST. LOUIS COUNTY
K-881
NOTES
WING WALLS
WING WALLS
WING WALLS
FRAMES
FRAMES
END WALLS AND FOOTINGS CENTER BENT AND HANDRAIL
FOOTINGS
SLAB

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